TABLE 3.2

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- GROUNDWATER INVESTIGATION
OU2 RI/FS WORK PLAN
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step		Medium:	Groundwater in OU2		
		Investigation Phase:	Phase 1A	Phase 1B	Phase 2
		Investigation Item:	Investigation of Soil/Fill on Southern Parcels	Comparison of Soil to Background	Groundwater Investigation (if necessary) (See OU1 Phase 2A/B DQO)
1	***State the Problem***				
	i) Problem description		Insufficient soil/fill quality data exist for OU2 in order to determine the presence or absence of risks to groundwater from contaminated soil or fill.	Insufficient groundwater quality data exist for OU2 in order to determine whether potential groundwater contamination is from the Site or from off-Site sources.	- If soil/fill samples contain Site-related contaminant concentrations greater than USEPA SSL criteria for the protection of groundwater or Ohio EPA leach-based soil values, or if groundwater samples collected in the current (2013-2014) Phase 2A/B groundwater investigation contain Site-related contaminant concentrations greater than USEPA MCL or RSL-tapwater criteria, a groundwater investigation will be conducted to delineate areas of OU2 groundwater contamination.
	ii) Planning team		See note at bottom		

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DQO Step	*Medium:* / *Investigation Phase:* / *Investigation Item:*	*Groundwater in OU2*		
		Phase 1A	***Phase 1B***	***Phase 2***
		Investigation of Soil/Fill on Southern Parcels	***Comparison of Soil to Background***	***Groundwater Investigation (if necessary) (See OU1 Phase 2A/B DQO)***
iii) Conceptual model	- Fill and/or contaminated soils above or below the water table may act as a source for groundwater contamination due to leaching and infiltration (Phase 1). Contaminated groundwater related to Site-activities may have migrated outside the boundaries of OU1. The presumed groundwater flow direction is westward towards the Great Miami River and to the south, and thus, groundwater could transport contaminants to surface water and/or the downgradient drinking water well. The lower aquifer is a designated sole-source aquifer. -VOC, such as TCE, may volatilize from groundwater into vadose zone soil gas, which may migrate to indoor air via foundation cracks and utility penetrations in buildings, or may discharge to ambient air via dispersion (Phase 2).		
iv) General intended use for data	The soil data collected from each borehole will be used to identify areas in OU2 that may contribute to groundwater contamination. The data collected will be compared against Ohio EPA leach-based soil values and USEPA screening levels in soil (SSLs) that are protective of groundwater to identify risks associated with soil in OU2. Groundwater samples from each soil boring where groundwater is encountered will serve to provide an indication of potential impacts to groundwater related to infiltration of surface water, migration of groundwater through the fill material, or from upgradient sources. The groundwater sample concentrations may also serve to provide an indication of risks to vapor intrusion.		The OU1 Phase 2A/B data and any previously-generated and validated data (historic monitoring wells and vertical aquifer samples (VAS)) will be used to determine the extent and magnitude of groundwater contamination above action levels, and generate exposure estimates for an assessment of ingestion of groundwater contamination. The data will also be used to determine risks of groundwater volatilization into vadose zone soil gas, which may migrate to indoor air or discharge to ambient air. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.

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		Phase 1A	***Phase 1B***	***Phase 2***
		Investigation of Soil/Fill on Southern Parcels	***Comparison of Soil to Background***	***Groundwater Investigation (if necessary) (See OU1 Phase 2A/B DQO)***
	v) Resources, constraints, deadlines	Sufficient resources will be committed to sample soil and water on the Southern Parcels and beyond (if necessary) under the OU2 RI/FS work plan. Sampling may be postponed due to flooding.		
2	***Goals of the Study:***			
	i) Primary study question	Do soil samples from soil borings in OU2 contain Site-related contaminants at concentrations greater than Ohio EPA leach-based soil value, USEPA SSLs, or USEPA Vapor Intrusion Screening Levels (VISLs) for groundwater?	What is the extent of groundwater with Site-related contaminants exceeding USEPA maximum contaminant levels (MCLs), RSLs for tapwater, or USEPA VISLs?	
	ii) Alternate outcomes or actions	- If sampling demonstrates that contaminant concentrations in soil are less than screening levels/criteria for leaching to groundwater, and less than USEPA VISLs, these potential migration pathways can be eliminated in the CSM for this area. - If soil samples collected from the borehole demonstrate that contaminant concentrations in soils are greater than screening levels/criteria, and greater than background reference conditions, groundwater investigative activities may be warranted to delineate the groundwater plume and/or fully characterize risks to human health.	- If sampling demonstrates that human health risks are acceptable, no further action is required. - If sampling demonstrates the presence of a Site-related groundwater contaminant plume, further study may be needed to evaluate alternatives for groundwater restoration. - If sampling demonstrates unacceptable human health risks, further evaluation, risk management and/or remediation would be required.	

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DQO Step	*Medium:* / *Investigation Phase:* / *Investigation Item:*	*Groundwater in OU2* — *Phase 1A* — *Investigation of Soil/Fill on Southern Parcels*	*Phase 1B* — *Comparison of Soil to Background*	*Phase 2* — *Groundwater Investigation (if necessary) (See OU1 Phase 2A/B DQO)*
	iii) Type of problem (decision or estimation)[1]	Decision (Action Level)		Decision (Action Level)
	iv.a) Decision statement	Determine whether contaminant concentrations in the soil borings are greater than USEPA SSLs, Ohio EPA leach-based soil values, or USEPA VISLs.		Determine whether groundwater in OU2 with Site-related contamination poses an unacceptable ingestion or inhalation risks to human health.
	iv.b) Estimation statement & assumptions	--		--
3	***Identify Information Inputs:***			

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		Phase 1A	***Phase 1B***	***Phase 2***
		Investigation of Soil/Fill on Southern Parcels	***Comparison of Soil to Background***	***Groundwater Investigation (if necessary) (See OU1 Phase 2A/B DQO)***
i) Information types needed		- Soil sample analysis from OU2 - Soil samples will be collected on a random basis (random oriented grid) across OU2. - Soil samples will also be collected at data gap locations or areas of suspected soil contamination.	- Soil sample analysis from background locations	- Existing and newly-collected groundwater data from OU2.
ii) Information sources		- Newly-collected and existing data from OU2	- Newly-collected and existing data from background locations.	- Newly-collected and validated data - Any available previous validated data (e.g., from historic monitoring wells and VAS samples) from OU2.
iii) Basis of Action Level		Action Levels are: - USEPA SSLs - Ohio EPA leach-based soil values		Action levels are: - USEPA MCLs, and RSLs for Tap Water where MCLs are unavailable - USEPA VISLs for groundwater
iv) Appropriate sampling & analysis methods		Methods are described in the Field Sampling Plan (CRA, January 2011) and the Quality Assurance Project Plan (CRA, September 2008).		

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DQO Step	Medium: / Investigation Phase: / Investigation Item:	Groundwater in OU2 – Phase 1A: Investigation of Soil/Fill on Southern Parcels	Groundwater in OU2 – Phase 1B: Comparison of Soil to Background	Groundwater in OU2 – Phase 2: Groundwater Investigation (if necessary) (See OU1 Phase 2A/B DQO)
4	***Define the Boundaries of the Study:***			
	i) Target population, sample units	- The target population are soils on the Southern Parcels, to be extended to soils elsewhere in OU2 if the extent of contamination above screening levels cannot be delineated in the Southern Parcels alone. The sampling units are individual samples collected from the soil.	- The target population are soils outside of OU1 and the Southern Parcels that are expected to represent background contaminant levels. The sampling units are individual samples collected from the soil.	Target population is groundwater within the Southern Parcels. If a Site-related groundwater plume extends beyond the Southern Parcels, additional sampling to delineate the plume will be necessary. Sampling units are individual groundwater samples collected from monitoring wells.
	ii) Specify spatial boundaries	The spatial boundaries are the limits of Site-related contamination above screening levels. Additional unsaturated soil samples will be collected at depths greater than 15 ft bgs. Boreholes will be advanced up to 5 ft into native material or until refusal, whichever is encountered first.		The spatial boundaries are defined by the extent of Site-related groundwater contamination in OU2.

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	Medium:	***Groundwater in OU2***		
	Investigation Phase:	***Phase 1A***	***Phase 1B***	***Phase 2***
DQO Step	***Investigation Item:***	***Investigation of Soil/Fill on Southern Parcels***	***Comparison of Soil to Background***	***Groundwater Investigation (if necessary) (See OU1 Phase 2A/B DQO)***
iii) Specify temporal boundaries		The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on the exposure assumptions of the Action Levels.		- Permanent monitoring wells can be installed at any time based on the results of the soil/fill investigation. - Two sampling events total will be carried out at newly installed monitoring wells, during periods of high (i.e. February - April) or low (i.e., June - September) groundwater elevations. Seasonal groundwater flow fluctuations will be evaluated based on historic Site data, and will be demonstrated by the completion of a Site-wide groundwater elevation monitoring round completed prior to each sampling event.
iv) Identify any other practical constraints		- Practical constraints anticipated for sampling of Southern Parcel soil include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. - Safety issues associated with sampling adjacent to surface water will also be considered for sampling activities on the Quarry Pond Parcels.		
v.a) Scale of inference for decision making		Comparisons to Action Levels and background levels will be carried out on an individual-location basis.		
v.b) Scale of estimates		--		--

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	Medium:	***Groundwater in OU2***		
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DQO Step	***Investigation Item:***	***Investigation of Soil/Fill on Southern Parcels***	***Comparison of Soil to Background***	***Groundwater Investigation (if necessary) (See OU1 Phase 2A/B DQO)***